DATASHEET F-201EI

LOW-ΔP-FLOW F-201EI

Mass Flow Controller for low pressure drop or corrosive gas service, industrial style

Thermal Mass Flow Controllers for low pressure drop or corrosive gas applications, industrial style

Bronkhorst® model F-201EI Mass Flow Controllers (MFCs) are suited for precise measurement of flow ranges between 0,028…1,4 l_n/min and 0,24…12 l_n/min (N_2-equivalent). The instruments are particularly suited for corrosive gases or applications with very low differential pressure (ΔP). Compared to conventional instruments, LOW-ΔP-FLOW MFCs have larger flow channels to minimize the risk of clogging, facilitate cleaning and purging, and cause lower pressure drop (the sensor only requires 0,5 to 5 mbar). This model is of rugged design (IP65) for use in industrial environments or even Zone 2 hazardous areas, with optional ATEX Cat. 3 or FM Class I, Div. 2 approval.

The integrated digital pc-board provides signal and fieldbus conversion as well as PID controller functionality for mass flow control by means of the integrated control valve. In addition to the standard RS232 output the instruments also offer analog I/O. As an option, an on-board interface can be mounted to provide CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK or FLOW-BUS protocols.

Technical specifications

Measurement / control system

Flow range (intermediate ranges available)	min. 0,028…1,4 l_n/min max. 0,24…12 l_n/min (based on N_2)
Accuracy (incl. linearity) (based on actual calibration)	± 1 % FS
Repeatability	< 0,2 % RD
Turndown ratio	1:50 (2…100%)
Max. operating pressure	10 bar g
Multi fluid capability	Storage of max. 8 calibration curves
Settling time (in control, typical)	2 … 3 sec.
Control stability	< ± 0,1 % FS (typical)
Operating temperature	-10 … +70 °C for ATEX cat. 3 and FM Class 1 Div 2 : 0…50°C
Mounting	horizontal
Temperature sensitivity	< 0,1% FS/°C
Pressure sensitivity	0,1% Rd/bar typical N_2
Max. Kv-value	$6{,}6 \times 10^{-2}$
Leak integrity, outboard	tested < 2×10^{-9} mbar l/s He

Measurement / control system

Warm-up time	30 min. for optimum accuracy 2 min for accuracy ± 2% FS

Mechanical parts

Material (wetted parts)	stainless steel 316L or comparable; other on request
Process connections	compression type or face seal (VCR/VCO) couplings
Seals	standard: FKM/Viton®; options: EPDM, FFKM/Kalrez®, FDA and USP Class VI approved compounds
Weight	1,3 kg
Ingress protection	IP65

Electrical properties

Power supply	+15 … 24 Vdc			
Max. power consumption	Supply	at voltage I/O	at current I/O	extra for fieldbus
	15 V	290 mA	320 mA	<75 mA
	24 V	200 mA	215 mA	<50 mA
Analog output	0…5 (10) Vdc or 0 (4)…20 mA (sourcing output)			
Digital communication	standard: RS232; options: CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK or FLOW-BUS			

Electrical connection

Analog/RS232	8 DIN (male);
PROFIBUS DP	bus: 5-pin M12 (female); power: 8 DIN (male);
CANopen® / DeviceNet™	5-pin M12 (male);
FLOW-BUS/Modbus-RTU/ASCII	5-pin M12 (male)
Modbus TCP / EtherNet/IP / POWERLINK	bus: 2 x 5-pin M12 (female) (in/out); power: 8 DIN (male);
EtherCAT®/ PROFINET	bus: 2 x 5-pin M12 (female) (in/out); power: 8 DIN (male)
IEC 61010-1	IEC-61010-1:2010 including national deviations for UL (61010-1:2012) and CSA (C22.2 No. 61010-1-12)

Control valve options

External actuator options to be connected to the controller

Certification for hazardous areas

Approvals / certificates

Technical specifications subject to change without notice.

For dimensional drawings and hook-up diagrams please visit the product page on our website

Recommended accessories

E-8000 SERIES

Digital Readout / Control Systems

- Bright, wide angle, 1.8" display (TFT technology)
- User friendly operation, menu driven with 4 push buttons

BRIGHT SERIES

Compact Local R/C Module

- Bright, wide angle, 1.8" display
- User friendly operation
- Indication/operation/configuration

PIPS SERIES

Plug-in Power Supply

- For lab-style or industrial devices
- Interchangeable plugs (Euro, UK, USA, Australian, IEC) for mains connection

IN-LINE FILTER
LOW FLOW SERIE M-411

- 1/4" female in / male out
- 100 bar
- Average porosity 0.5...15 µm

Related products

LOW-ΔP-FLOW F-201DI

- Min. flow 0,42…21 mln/min
  Max. flow 0,042…2,1 ln/min
- Pressure rating up to 10 bar
- Low ΔP, easy to purge
- Compact IP65 design

LOW-ΔP-FLOW F-202DI

- Min. flow 0,28…14 ln/min
  Max. flow 0,5…25 ln/min
- Pressure rating up to 10 bar
- Low ΔP, easy to purge
- Compact IP65 design

LOW-ΔP-FLOW F-201EV

- Min. flow 0,028…1,4 ln/min
  Max. flow 0,24…12 ln/min
- Pressure rating up to 10 bar
- Low ΔP, easy to purge
- Compact design

LOW-ΔP-FLOW F-101EI

- Min. flow 0,028…1,4 ln/min
  Max. flow 0,24…12 ln/min
- Pressure rating up to 10 bar
- Low ΔP, easy to purge
- Compact IP65 design

Bronkhorst®

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Bronkhorst High-Tech designs and manufactures innovative instruments and subsystems for low-flow measurement and control for use in laboratories, machinery and industry. Driven by a strong sense of sustainability and with many years of experience, we offer an extensive range of (mass) flow meters and controllers for gases and liquids, based on thermal, Coriolis and ultrasonic measuring principles. Our global sales and service network provides local support in more than 40 countries. Discover Bronkhorst®!